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[CLICK HERE FOR PUBLIC WORK's REPORT DATED MARCH 11, 2009](#)

[CLICK HERE FOR PUBLIC WORK's REPORT DATED MARCH 12, 2009](#)

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GAIL FARBER, Director

COUNTY OF LOS ANGELES

DEPARTMENT OF PUBLIC WORKS

"To Enrich Lives Through Effective and Caring Service"

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IN REPLY PLEASE

REFER TO FILE: **WW-0**
A2952

March 11, 2009

TO: Each Supervisor

FROM: Gail Farber
Director of Public Works

BOARD MOTION OF NOVEMBER 5, 2008, AGENDA ITEM 70-A PUBLIC OUTREACH EFFORT ON WATER DISINFECTION OPTIONS

Recommendations

1. Initiate discussions with the Antelope Valley-East Kern Water Agency on the use of granular activated carbon (GAC) and chlorine for its treatment plants instead of chloramines to comply with the new regulatory standards for trihalomethanes (THMs).
2. Report back to your Board with an implementation action plan within 120 days.

Background

On November 5, 2008, your Board directed Public Works to conduct a public outreach effort (including hosting community meetings throughout the Antelope Valley, providing information about chloramines to the media, and enclosing information about chloramines in water bills to the Waterworks Districts' customers) and report back to your Board within 120 days.

The following is a report describing the public outreach effort and summarizing the feedback received from the community meetings.

Public Outreach Effort

Community meetings were conducted in Acton, Lancaster, Palmdale, and Lake Los Angeles in late January. Presentations by the Los Angeles County Waterworks Districts' staff covered the following topics:

- Regulatory Requirements - The regulatory requirement to disinfect drinking water to protect the public's health and safety from potential microbial contamination.
- Health Effects - The health effects of THMs, known carcinogens, and by-products of the disinfection of drinking water with chlorine.
- Disinfection Options – The two applicable disinfection options identified by a study conducted for the Antelope Valley-East Kern Water Agency by a private engineering consultant in 2005 that were discussed are:
 1. Chloramines - Use of chloramines (a combination of chlorine and ammonia), instead of the currently used chlorine for disinfection.
 2. Granular Activated Carbon - Use of GAC filters to remove organic materials that produce THMs when chlorine is used to disinfect the water.
- Advantages and Disadvantages - The advantages and disadvantages of available disinfection options to comply with newly enacted, more stringent water quality standards for THMs (see attached).

In addition to the community meetings, the following public education actions were completed:

- Included educational materials in the Districts' Fall Splash newsletter sent to all customers with their bills.
- Presented to the Palmdale Chamber of Commerce on November 19, 2009, that included an interview with the local television station.
- Provided information to the Antelope Valley Press for an article published on January 23, 2009.
- Conducted a telephone interview with Jim Crockett for the Agua Dulce/Rosamond/Lake Los Angeles News.

- Responded to numerous correspondences and emails and provided the individuals with information related to chloramines.

Meeting Attendees - There were 206 community members who signed the attendance sheet. The majority of the attendees favored the use of GAC and chlorine disinfection.

Following are the most frequently raised concerns regarding the use of chloramines for drinking water disinfection.

- Skin rashes and respiratory problems that are purportedly attributed to the use of water disinfected with chloramines.
- Effects on fish and amphibians. The ammonia in chloraminated water is harmful to fish and amphibians if not removed.
- Leaching of lead and copper from household plumbing. Water that is disinfected with chloramines could result in more leaching of lead and copper from household plumbing than with chlorine.
- Contamination of groundwater with nitrate. The ammonia from chloraminated water, used to irrigate landscaping, could contaminate the groundwater basin.
- Formation of yet-to-be-regulated disinfection by-products. The potential for harmful disinfection by-products from the use of chloramines.
- Removal of chloramines from water. The cost to remove chloramines using home treatment systems.

These concerns are not unique to the residents of Acton and the Antelope Valley and have been extensively investigated and addressed by the Federal Environmental Protection Agency, the State Department of Public Health, and other reputable organizations.

Conclusion

The current chlorine disinfection of the water in Los Angeles County Waterworks District Nos. 40, Antelope Valley, and 37, Acton, has to be changed to meet new, more stringent water quality requirements. There are two disinfection options being considered, each has its own technical advantages and disadvantages. Both options will result in an increase in the cost of water to the Districts' 55,000 customers and will be subject to Proposition 218 notification requirements.

We held community meetings in Acton, Lancaster, Palmdale, and Lake Los Angeles to solicit feedback on the two options. The majority of the meeting attendees favored the use of GAC and chlorine disinfection.

Before implementation of GAC, we need to work with the Antelope Valley-East Kern Water Agency to resolve any technical issues to ensure the safety of the treated water. GAC does not remove bromide salt, prevalent in State Water Project water during dry periods, and it has not been used in a large scale filtration plant for the control of THMs. Recently, the Palmdale Water District started using GAC and is still making adjustments to its system to ensure safety standards are met. We also want to carefully monitor GAC filtration costs since the cost of the materials has increased almost 133 percent in the last five years.

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Attach.

cc: Chief Executive Office (Lari Sheehan)
County Counsel
Executive Office

ADVANTAGES AND DISADVANTAGES OF DISINFECTION OPTIONS

March 11, 2009

1. **Chloramines** – Use of chloramines, a combination of chlorine and ammonia, instead of the currently used chlorine for disinfection. Chloramines do not produce THMs when they are used to disinfect water.

Advantages	Disadvantages
Low levels of THMs are formed.	There is a potential for the growth of bacteria through a process called "nitrification" if the distribution system is not adequately maintained.
Chloramines are likely to form less THMs in the distribution system and last longer, which helps prevent the growth of bacteria.	Chloramines can be harmful to fish and amphibians if a water conditioner is not used.
Most people report better taste and odor for chloraminated water as compared to chlorinated water.	Kidney dialysis equipment must be modified to remove chloramines.
Use of chloramines will modestly increase customers' water bills by 5% to 16%, depending on water usage.	Use of chloramines could cause more lead and copper leaching in household plumbing than chlorine if corrosion control practices are not followed.

Communities in California using Chloramines: Agoura Hills, Anaheim, Antioch, Beverly Hills, Brentwood, Burbank, Burlingame, Calabasas, Corona, El Segundo, Glendale, Goleta, Hidden Hills, Irvine, Lake Elsinore, Livermore, Long Beach, Malibu, Manhattan Beach, Martinez, Murietta, Newport Beach, Norco, Oakland, Orange, Palo Alto, Pasadena, Pittsburgh, Pleasanton, Redwood City, Riverside, San Bruno, San Diego, San Francisco, Santa Ana, Santa Barbara, Santa Clara, Santa Clarita, Santa Maria, Santa Monica, Temecula, Topanga, Tustin, Val Verde, Ventura, and Westlake Village.

2. **Granular Activated Carbon** – Use of GAC filters removes organic materials that produce THMs when chlorine is used to disinfect the water.

Advantages	Disadvantages
It removes organic materials and, as a result, produces low levels of THMs and, overall, potentially better water quality.	Use of GAC will increase customers' water bills by 28% to 96%, depending on water use.
Most people report better taste and odor due to removal of organic materials from the water.	GAC does not remove bromide salt (prevalent in State Water Project water particularly during dry periods), which forms THMs when chlorine is used for disinfection. Additionally, because GAC does not remove all of the organic materials from water, THMs will continue to be formed in the distribution system.
	The need for frequent GAC replacement could impact treatment plant operations and production capacity.

Agencies in California using GAC: There are presently two agencies in California using GAC, and they are Crestline-Lake Arrowhead Water Agency and Palmdale Water Agency.

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END



GAIL FARBER, Director

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March 12, 2009

IN REPLY PLEASE

REFER TO FILE: **WW-0**
A2874-7

TO: Each Supervisor

FROM: Gail Farber
Director of Public Works

A handwritten signature in cursive script that reads "Gail Farber".

BOARD MOTION OF AUGUST 5, 2008, AGENDA ITEM 17 **MONTHLY REPORT ON PROGRESS OF WATER CONSERVATION EFFORTS**

On August 5, 2008, your Board directed the Acting Director of the Department of Public Works (Public Works) to report monthly on the progress of the County's multidepartmental water conservation efforts. The following is the seventh monthly report that summarizes the progress of a collaborative effort to implement the water conservation and drought response actions approved by your Board on July 1, 2008.

Action No. 1 (100 percent complete)

Declare a Countywide Water Supply and Conservation Alert.

On August 5, 2008, your Board adopted a resolution declaring a Countywide Water Supply and Conservation Alert urging County residents, businesses, local water purveyors, and cities to intensify water conservation efforts. A letter was sent to all 88 cities in the Los Angeles County on October 20, 2008, to inform them of the Alert and request their support to intensify water conservation efforts.

Action No. 2 (100 percent complete pending adoption by your Board)

Update and adopt a water wasting ordinance for unincorporated County areas and the Waterworks Districts' Phased Water Conservation Plan.

A water wasting ordinance was approved by your Board on October 7, 2008. The ordinance established water conservation and waste prevention measures for unincorporated County areas. A letter was sent on December 30, 2008, to all water companies serving unincorporated County area residents to request that they inform their customers of the ordinance and encourage their customers' voluntary compliance with the ordinance's provisions.

Each Supervisor
March 12, 2009
Page 2

In addition, the updated Phased Water Conservation Plan (Plan) for the Los Angeles County Waterworks District Nos. 21, Kagel Canyon, 29, Malibu, and the Marina del Rey Water System; 37, Acton, and 40, Antelope Valley was approved by your Board on March 3, 2009. The updated Plan for the Los Angeles County Waterworks District No. 36, Val Verde, is expected to be submitted for your Board's consideration in late May

Action No. 3 (100 percent complete)

Direct all County departments to evaluate water usage, immediately implement conservation measures to reduce consumption by a target amount of 10 percent by December 31, 2008, and report back to your Board with recommended measures to reduce consumption by an additional 10 percent.

The Internal Services Department (ISD), Public Works, and the Department of Parks and Recreation (DPR) completed their water utility bill analysis and determined that recent conservation efforts have reduced Countywide water usage by 9.5 percent for the period of July 1, 2008, to December 31, 2008, as compared to the same period in 2006.

Public Works reduced its water usage by 22.2 percent with significant water savings achieved by retrofitting the cooling water system and installing weather-based irrigation controllers at its Alhambra Headquarters. DPR reduced its water usage by 9.0 percent through installation of weather-based irrigation controllers, waterless urinals, and drought-tolerant plants at 71 parks. Additionally, ISD achieved a water use reduction of 8.9 percent at ISD-managed facilities by educating facility managers and disseminating information on available water conservation rebate and incentive programs.

Attached is a report providing additional information on the water use reductions and conservation measures to reduce consumption by an additional 10 percent.

Action No. 4 (100 percent complete)

Send a five-signature letter to the Governor and leadership of the Legislature urging the State to expedite the award of bond funds from Propositions 84 and 1E to local agencies, including the County of Los Angeles.

A five-signature letter was sent to the Governor and leadership of the Legislature on July 7, 2008

Action No. 5 (100 percent complete)

Send a five-signature letter to the Governor and leadership of the Legislature expressing support for the Governor's Delta Vision, which provides a comprehensive, sustainable management plan for the Delta that includes conveyance, expanded storage, ecosystem restoration, and conservation.

A five-signature letter was sent to the Governor and leadership of the Legislature on September 12, 2008.

Action No. 6 (100 percent complete)

Direct the Chief Executive Officer (CEO) through the Office of Recycled Water and the Energy and Environmental Policy Team in collaboration with ISD, Public Works, DPR, Fire, Sheriff, and other appropriate departments to develop a recycled, nonpotable water infrastructure plan for County facilities; the planning process to include consultation with appropriate water purveyors and waste water treatment agencies. The recycled water infrastructure plan should establish priorities based upon amount of potable water saved and include a funding analysis and recommendations.

The Recycled Water Infrastructure Implementation Committee submitted its final report to your Board on February 3, 2009.

Action No. 7 (30 percent complete)

Direct the CEO, working with the Energy and Environmental Policy Team and with input from water conservation specialists to ensure utilization of Best Management Practices, including Leadership in Energy and Environmental Design and Low Impact Development, to develop a water conservation policy applicable to retrofit, refurbishment, and new construction of County facilities and grounds.

The CEO, Public Works, DPR, and ISD are collaboratively preparing a checklist of Best Management Practices, including Leadership in Energy and Environmental Design and Low Impact Development that will be used to ensure that appropriate water conservation practices are incorporated in projects for the retrofit, refurbishment, and new construction of County facilities and grounds.

Action No. 8 (100 percent complete)

Instruct the Director of Public Works and the Director of Planning to consult with the various water agencies that provide water services to County unincorporated areas, and report back to your Board in 30 days requesting information on how the drought may impact the land development review process for both discretionary and ministerial applications, and what your Board can expect regarding future actions by water agencies on pending development projects in the unincorporated area.

Public Works and DPR sent a Drought Impact Questionnaire to unincorporated County area retail water purveyors requesting information on how the drought may impact the land development review process. A report summarizing the responses to the Questionnaire was completed on October 9, 2008, and sent to all Board offices.

Updates on these Action Items are also available on the Countywide Energy and Environmental website at <http://www.green.lacounty.gov>, which will be updated regularly

If you have any questions regarding this matter, please call me or your staff may contact Adam Ariki at (626) 300-3300

DWP:dvt

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Attach.

- cc. Executive Office, Board of Supervisors
- County Counsel
- Sheriff
- Chief Executive Office (William T Fujioka, Lari Sheehan)
- Fire Department
- Internal Services Department
- Department of Beaches and Harbors
- Department of Parks and Recreation
- Department of Public Health
- Department of Regional Planning

WATER CONSERVATION MEASURES BY COUNTY DEPARTMENTS

On August 5, 2008, your Board adopted a Resolution declaring a Countywide Water Supply and Conservation Alert and directing all County departments to evaluate water usage, immediately implement conservation measures to reduce consumption by a target amount of 10 percent by December 31, 2008, and report back to your Board with recommended measures to reduce consumption by an additional 10 percent.

Following is a summary of the multidepartmental effort to accomplish this goal.

Results of Water Conservation Measures Already Implemented

The Department of Public Works (Public Works), the Internal Services Department (ISD), and the Department of Parks and Recreation (DPR) completed their water utility bill analysis for the period of July 1, 2008, through December 31, 2008, to quantify the impact of recent conservation efforts to reduce Countywide water usage. Due to normal billing cycles, the consumption results for the water accounts through December 31, 2008, were not available for reporting until recently. Similar updated reports will continue to be provided to your Board on a regular basis until the current drought ends. Separately, ISD has nearly completed formatting and archiving this data utilizing ISD's Enterprise Energy Management Information System (EEMIS) to track water costs and long-term consumption as is done now for electricity and natural gas. EEMIS will facilitate future tracking and reporting using water bill information from all County departments, allowing departmental facility managers to independently view their historic utility usage and costs at any time.

The County has nearly 1,600 separately metered water accounts from 120 different water purveyors. Public Works, ISD, and DPR receive the water bills for all County facilities. In tracking County water usage during the last half of 2008 representatives of the three departments met regularly to monitor and assess the County's conservation effort. A coordinated process was developed to compare recent water usage for higher volume accounts to the usage during the same period of a baseline year. Fiscal Year 2006-07 was selected as the baseline year for comparison purposes because water usage patterns at that time best represent conditions prior to the current drought.

In order for DPR to have comparable data to evaluate a reduction in water consumption, several facilities were excluded from this reporting period including.

- Park facilities that were under major construction and not operating at normal capacity
- Park facilities with new amenities and improvements that added new water usage after 2006
- New park facilities added to DPR's system after 2006 that were excluded because there was no comparison data.

In an aggressive measure to reduce potable water consumption, DPR has been developing and implementing new water conservation projects and initiatives, which include SMART Irrigation Controllers at 71 parks, waterless urinals, split water metering, and installation of drought-tolerant plant material.

DPR is also in the process of implementing the Phase I Recycled Water Master Plan, which includes providing recycled water to Victoria and Pathfinder Parks and Los Amigos and Alondra Golf Courses within the next year

In summary, water conservation efforts for Public Works, ISD, DPR, and the entire County for the period of July 1, 2008, through December 31, 2008, as compared to the same period in 2006 resulted in the following savings.

	Savings (%)
Department of Public Works	22.2
Internal Services Department	8.9
Department of Parks and Recreation	9.0
Total for County	9.5

Additional Conservation Measures To Achieve Further Reductions

To assist each department in meeting the recommended water demand reduction goals, ISD developed guidelines and conservation measures that were distributed to County facilities managers in September 2008. Attached are the individual behavior modification tips (Attachment A) and facility hardware changes (Attachments B and C) that will, when implemented, be instrumental in further reducing water demands.

Last year, ISD commissioned a water savings study that focused on water use for commercial building heating and cooling systems. Cooling water use constitutes a large portion of the water consumed at these facilities. Substantial water savings can be achieved by replacing older cooling water systems that require a continuous stream of water with newer systems that recirculate the cooling water. Such systems have been installed at the Civic Center Heating and Refrigeration Plant and Peter J. Pitchess Honor Rancho Power Plant, two of the County's largest cooling-water-use facilities, and at Public Works' Alhambra Headquarters. Initial results from testing at these facilities indicate that water savings of approximately 15 percent (30 million gallons) can be achieved annually. Additional systems are scheduled for installation at other selected sites in 2009.

The installation of cooling water recirculation systems currently represents the most economical and effective method to reduce water consumption at County facilities. As a result, ISD has requested \$500,000 in its Fiscal Year 2009-10 Energy Efficiency Projects budget request to install the systems at facilities throughout the County. In the event that the budget request is not approved, ISD plans to provide support to its

customer departments to fund implementation of the systems as part of their routine or extraordinary building maintenance budgets.

At the September 23, 2008, quarterly meeting of Countywide departmental facility managers, representatives from the City of Los Angeles Department of Water and Power and the Metropolitan Water District of Southern California gave presentations on their available water conservation rebate and incentive programs. County facilities may be eligible to receive rebates of 50 to 100 percent of equipment costs for the installation of water-saving devices. Rebate amounts and eligibility vary from area to area, so a check with the water supplier is necessary prior to the start of any modification. Facility managers from various departments have indicated that installations of water-saving devices in their facilities are proceeding

10 EASY TIPS TO REDUCE WATER CONSUMPTION

1. **Shorten your watering cycles.** Up to 70 percent of residential water use goes to maintaining our yards. Taking 1 minute off a 10-minute cycle saves 10 percent!
2. **Check your sprinkler system.** Do a weekly check for broken or clogged sprinkler heads and replace them right away. Make sure you are watering your yard and not the driveway or sidewalk.
3. **Fix those leaks.** Just a drip can waste more than 10,000 gallons per month. A leaking flapper on a toilet also increases flows at the water treatment plant.
4. **Plant native species or drought-tolerant plants.** Many of the lawns and plants we use are not intended for the unique climate in Southern California.
5. **Use a broom instead of a hose.** Sweeping up rather than hosing off leaves or grass clippings not only saves water, it reduces runoff.
6. **Get an adjustable hose nozzle for outdoor use.** With one of these you can adjust the spray to meet your needs. A hose running for 5 minutes uses the same amount of water as a 20-minute shower.
7. **Eliminate runoff.** Runoff could mean your lawn needs aeration. When you aerate your lawn, you give the water somewhere to go besides down the storm drain.
8. **Take shorter showers.** Cutting 2 minutes off your shower time can save 600 gallons a month for a family of 4. If you change the showerhead to a water-efficient model, you could save even more.
9. **Turn off the water** while you brush your teeth or shave.
10. **Wash only full loads of laundry or dishes.** Waiting until you have a full load can save you up to 20 gallons for the same amount of clean clothes.

Internal Services Department Water Conservation Measures

Internal Services Department (ISD) provides in-house, contracted, and advisory services in the areas of alterations and improvements, facilities maintenance and operations, energy management, and custodial and grounds maintenance services. ISD operates building systems and provides maintenance and repair services to over 200 County facilities consisting of approximately 21,000,000 square feet.

Current Water Conservation Measures – The measures listed below are standard procedures currently used by ISD to ensure water conservation

- Monitor and maintain flush valves on existing toilets and urinals – Maintaining flush valves on a routine basis ensures that leaks are discovered quickly, thus reducing the amount of water wasted and ensure all valves operate properly
- Maintain aerators and flow restrictors on faucets – Repair or replacement of aerators and flow restrictors control the stream of water to prevent splashing and limit the amount of water used during hand washing.
- Monitor pumps and seals for leaks – Various types of pumps are used to provide domestic water to all plumbing fixtures and are used to circulate comfort heating and cooling water used for air conditioning. With proper maintenance, energy costs are reduced and leaks are repaired preventing wasted water and possible building damage.
- Service cooling towers to maintain maximum efficiency and float levels to prevent overflow – Cooling towers use water to transfer building heat to the atmosphere to maintain a comfortable environment of a building. They work similar to a car radiator
- Check water make-up meters on closed loop chilled and hot water systems for excessive water use – Make-up meters are used to measure the amount of water lost during equipment operation. Measuring the amount of water consumed can reveal hidden water leaks or equipment failure.

Current Water Conservation Measures Continued

- Regular irrigation checks – Inspect irrigation system to ensure time clocks, control valves, and sprinkler heads are functioning properly for correct time of day and length of watering cycles for type of plants installed.
- Retro-commissioning buildings to provide more efficient air conditioning systems – Retro-commissioning is a systematic, documented process that identifies low-cost operational and maintenance improvements in existing buildings and brings the buildings systems that use heated and chilled water to optimal performance. Retro-commissioning typically focuses on energy-using equipment and optimizes existing system performance, rather than relying on major equipment replacement. It typically results in improved indoor air quality, comfort, controls, energy efficiency, and water conservation
- Continually monitor water bills – Check for unusual spikes in water consumption indicating possible leaks or problems. Coordinate with County departments to promote ways to conserve water and detect water leaks or excessive water consumption.
- Installing new water-saving devices – Installing waterless and low-flow fixtures when replacing existing fixtures significantly reduces the amount of water used.
- Landscape with drought-tolerant plants and vegetation – The installation of drought-tolerant plants at County facilities is used when replacement of plants is required
- Replace faucets with touch-less type when existing cannot be repaired – Touch-less type faucets limit the amount of water per use
- Install touch-less faucets and water-less urinals in all remodel projects.

Proposed Conservation Measures – Items proposed for future improvements in conservation measures.

- Investigate power plant modifications for use of recycled water in make-up water
– Make-up water is used to cool the power plant's equipment.
- Partner with Public Works Wastewater Division and Sanitation Districts to develop a "retro-commissioning" program for water and wastewater systems.
- Complete Leadership in Energy and Environmental Design Existing Building (LEED EB) studies, which include water conservation measures.
- Upgrade urinals and toilets – Replace flush-type urinals with low-flow or waterless and replace high-consumption toilets with low-flow. By converting urinals to waterless and all toilets to low-flow in the Hall of Administration, the County will save approximately 378,840 gallons of water per month or more than 4.5 million gallons per year

WATER USE – SLOWING THE FLOW

Most everyone who lives and works in Southern California is aware that we are having a dry spell again. California's extensive water supply infrastructure is designed to mitigate the effect of short-term dry periods for most water users. However, this year, California and the southwest is experiencing a supply shortage.

No one knows when this current drought will end. However, historically, droughts exceeding three years are relatively rare in Northern California, the source of much of the State's developed water supply.

Now, since the Governor has proclaimed a Statewide drought and the Los Angeles County Board of Supervisors has declared a Countywide Water Supply and Conservation alert, all County departments must pull together to reduce demands on our water reserves. The Board has directed each department to immediately implement conservation measures to reduce consumption by 10 percent by December 31, 2008, and recommend measures to reduce consumption by an additional 10 percent.

Since the first 10 percent reduction needs to take place this year, all departments must be proactive in their conservation efforts.

The following is a list of conservation measures each department can implement to initiate water savings at County facilities that will help in reaching the requested 20 percent savings target.

No Cost/Low Cost. Each department needs to educate staff to reduce water usage at facilities through an awareness campaign urging that, individually, we all can make a difference. Hardware changes such as low-flow shower heads and faucets, coupled with responsible-use habits, will lead to effective conservation and real water savings. Additionally, we can --

- Check facility for leaks and repair
- Encourage employees to conserve and to report water waste.
- Instruct landscape maintenance staff to reduce water use by repairing leaks, adjusting or replacing sprinkler heads to minimize overspray, adjust the sprinkler timer seasonally or replace timer with a smart controller
- Eliminate hosing down of walkways and driveways.
- Retrofit restrooms with self-closing faucets.
- Install water-saving faucet aerators in all restrooms.

Low-flow faucets. A standard lavatory sink faucet has a flow rate of 2.5-5 gallons per minute (gpm). Redesigned low-flow faucets have reduced this flow rate to 1.5-2.5 gpm while maintaining an adequate flow rate for hand washing. The design of the aerator installed in the outlet has made the faucets so successful. These aerators mix air into the water as it leaves the faucet, reducing both the flow and the amount of splashing, while increasing wetting efficiency

Savings.	40 percent
Cost:	Less than \$50/unit

Low-flow shower heads. These fixtures, similar to low-flow toilets, had to go through several design generations before they produced acceptable performance. Today's generation of low-flow showerheads have reduced flow rates, from as high as 7.5 gpm to less than 2.5 gpm. Since the units reduce the flow of hot water, they generate additional energy savings in water heating.

Savings:	50 percent or more
Cost:	Less than \$100/unit

Low-flow urinals. Urinals, like toilets, use large amounts of water. Before the advent of low-flow models, many urinals required 2-3 gallons of water per flush. Today's low-flow models all require less than 1 gallon per flush. Although designing a low-flow urinal did not present the same problems that manufacturers experienced with low-flow toilets, design changes were required in order to develop a unit that performed successfully. When coupled with a touchless, automatic control valve, water savings produced by low-flow urinals is even greater.

Savings.	50 to 70 percent
Cost:	Less than \$500/unit

Low-flow toilets. Toilets are the single largest users of water in many facilities. One flush of each standard toilet uses 3.5-5.5 gallons of water. By contrast, today's low-flow units require 1.5 gallons per flush.

Early generation units were plagued with operation and maintenance problems, giving low-flow units a bad reputation. Today's units have been completely reengineered for operation under low-flow conditions. Redesigned water inlets, traps, and directing jets eliminate the need to flush twice, a common complaint concerning the operation of early low-flow models.

Savings.	60 to 70 percent
Cost:	\$1,500/unit

Touchless controls. Touchless controls for restroom faucets have been widely promoted as a means of improving hygiene in restrooms. An infrared sensor

detects a user's hands under the faucet and turns on the water. Removing the hands turns off the water flow. Unlike timed and other automatic controls, touchless controls limit water flow. They also promote water conservation for toilets and urinals. By automatically flushing the units after use, automatic controls prevent users from overflushing.

Savings: 50 percent or more
Cost: \$1,755/unit

Waterless urinals. The newest addition to water-conserving devices is the waterless urinal. Applicable to both new construction and retrofits, the units operate without water or a flush valve. To form a barrier that prevents odors from entering the restroom, the urinals use an internal trap filled with a liquid that is lighter than urine. In a typical application, this urinal can save up to 44,000 gallons of water annually

Savings: 100 percent
Cost: \$2,580/unit

Point-of-use water heaters. Traditional building designs rely on a central water-heating system. A centrally located boiler generates hot water, which is distributed through insulated piping. Larger buildings use circulation pumps and large central storage tanks to improve system performance.

Systems designed to generate hot water at the point of use employ multiple, smaller water heaters located throughout a facility. Generating hot water at the point of use reduces distribution losses and, just as importantly, water requirements. When hot water is generated in a central system, even in circulating systems, water must be run for a few seconds before hot water is available to the user. Point-of-use water heaters eliminate this waste of water.

Savings: 50 percent or more
Cost: Greater than \$2,500/unit

Mechanical systems. One area that managers too often overlook when implementing a water-conservation program is a building's mechanical systems. Building boilers and cooling towers have significant requirements for water use that managers must consider

Both boilers and cooling towers use automatic valves to maintain water levels to keep contaminants within acceptable concentrations and to make up for water lost from the system. Controls that operate properly minimize water use, but control valves that stick or otherwise fail to operate properly use large volumes of water in a very short period of time. Balancing water quality saves water and energy, optimizes the use of water-treatment chemicals, reduces air and

wastewater emissions, and extends equipment life. Rebates up to \$3,000 are available for installing cooling tower pH controllers.

Managers must ensure that technicians inspect all water-using mechanical systems daily to ensure their proper operation.

Savings:	Up to 40 percent or as much as 800,000 gallons
Cost:	ISD estimates available

Maintenance issues

While water-conserving devices are low-maintenance items, they cannot simply be installed and forgotten. Technicians should check all units regularly and make periodic adjustments to flow-control devices.

Automatic flow controls require battery replacement every one to two years because dirt and contaminants in the water system can easily clog the small openings in flow-control devices.

Managers need to establish a schedule for inspecting and testing all water-conserving devices. By setting up the program as the devices are installed, managers can ensure that the program will achieve its greatest potential.

Utility Incentives and Other Support

When evaluating the potential for water savings in any facility, remember that financial assistance or incentives are available from many utilities to encourage customer conservation. Attached are lists of the current cash rebates available for installing water saving technologies from the Los Angeles Department of Water and Power (LADWP) and the Metropolitan Water District of Southern California (MWD). Although there are usually labor costs for installation, faucet aerators and low-flow shower heads are available free from many water suppliers.

Saving water is more important than ever, and ISD wants to help the County in reaching its goal of 15 to 20 percent reduction in overall water demand. Should your department have any questions regarding any of the conservation measures mentioned, assistance evaluating incentive availability or help with installation, please contact ISD's Facilities Operations Service at (323) 267-2105. Also, go to green.lacounty.gov, LA County's Energy and Environmental website for information on energy and water-efficiency policies and programs.

ISD will be monitoring County water usage and will report to the Board later this year on the savings achieved. Included in this report will be the steps being taken to reach the long-term goal of 15 percent to 20 percent reduction in water demand.

This drought will impact all of us so it is vitally important that we work together to minimize its impacts.

Cash Rebates

for Commercial, Industrial and Institutional Water Customers of the MWD

Plumbing Fixtures:

- Ultra Low Flush Toilets (1.6 gpf or less) \$135
(1.6 gpf replacing existing toilet or 3.5 gpf or more)
- High Efficiency Toilets (Dual Flush, or 1.28 gpf or less) \$165
(1.28 gpf or less replacing existing toilet of 3.5 gpf or more)
- High Efficiency Toilet Upgrade \$30
(three (3) gpf or less replacing toilet of 3.5 gpf to 1.28 gpf)
- Zero and Ultra Low Water Urinals \$400
(0.125 gpf or less replacing existing urinal of 3.5 gpf or more)
- Zero Water Urinal Upgrade/New Construction \$120
(0.125 gpf or less replacing existing urinal of 3.5 gpf)
- High-Efficiency Urinals \$200
(0.125 gpf or less replacing existing urinal of 3.5 gpf or more)
- High Efficiency Urinal Upgrade/New Construction \$60
(0.125 gpf or less replacing existing urinal of 3.5 gpf)

Food Equipment:

- Pre-Rinse Spray Heads \$60
- Connectionless Food Steamers \$485
per compartment

HVAC Equipment:

- Cooling Tower Conductivity Controllers \$625
- pH / Conductivity Controllers \$1,900

Medical Equipment:

- X-Ray Film Processor Recirc. System \$3,120
- Steam Sterilizer Retrofits \$1,900
- Dry-Vacuum Pumps \$125
per 0.5 HP

Cleaning Equipment:

- High Efficiency Clothes Washers \$210
(Coin and card operated)
- Pressurized Waterbrooms \$150

APPLICATION ENCLOSED

ATTACHMENT C-1

It's Time to Get Serious About Saving Water

X-Ray Machines

Toilets

Waterbrooms

Urinals

Washers

pH Controller

Businesses account for about one-third of the water used in our community. Some businesses use water only for sanitary purposes, while others irrigate to maintain attractive landscapes. Many companies use large amounts of water in different ways to develop products and to provide services.

The Metropolitan Water District is committed to helping businesses use water more efficiently in their facilities and in their processes.

Mail To:

Save Water - Save A Buck Rebate Program
P.O. Box 786, El Segundo, CA 90245

1-877-728-2282 or Fax to (310) 414-8820

Rebates vary by water agency and are subject to change. Rebate available to commercial customers served by the Metropolitan Water District's Family of Southern California Water Agencies.

For more information on our rebate program, log on to: www.bewaterwise.com

Click the Save A Buck icon



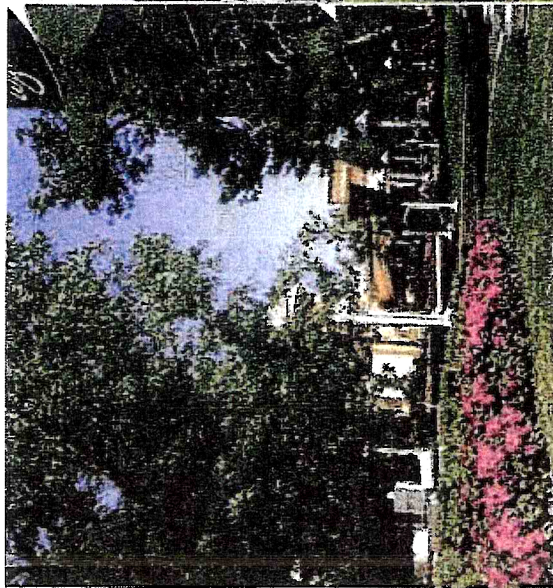
SAVE WATER
SAVE A BUCK

It's **EASY** to participate.
1-877-728-2282

www.bewaterwise.com

Commercial Rebate Program for Water Saving Devices

It's **EASY** to participate.
1-877-728-2282



APPLICATION ENCLOSED

ATTACHMENT C-2

It's Time to Get Serious About Saving Water

Now is the time to consider replacing your grass with new Synthetic Turf.

A great alternative for both small and large landscapes, wherever grass is currently used, Synthetic Turf is becoming increasingly popular for sports fields, golf courses, parks and public spaces as well as many commercial uses.

The advantages of Synthetic Turf are wide-ranging. In addition to the minimal maintenance required, a Synthetic Turf surface

- Requires no water
- Is aerthetically pleasing all the time—fresh cut appearance
- Needs no chemicals or fertilizer
- Never needs mowing or insecticides
- Can be cleaned—unlike mulch and shredded rubber
- Is safe—no more buried glass or other harmful objects

Over time, Synthetic Turf saves owners time, money, hassle and worry. Once installed, this synthetic surface continues to provide return on investment year after year all year long.

Synthetic Turf

\$0.30 REBATE per square foot
\$13,000 per acre
 no minimum - no maximum
 retrofits or new construction
 must replace irrigated area

Mail To:

Save Water - Save A Buck Rebate Program
 P.O. Box 786, El Segundo, CA 90245

1-877-728-2282 or Fax to (310) 414-8820

Rebates vary by water agency and are subject to change. Rebate available to commercial customers served by the Metropolitan Water District's Family of Southern California Water Agencies. **Update**

For more information on our rebate program, log on to: www.bewaterwise.com **1-877-728-2282**

Click the Save A Buck icon



It's **EASY** to participate. **BUCK**

1-877-728-2282

www.bewaterwise.com

Rebates on
Synthetic Turf for
 Commercial Outdoor Landscaping

Save **TIME**, Save **WATER**,
 Save **MONEY**
 and Reduce Wasteful Run-Off!

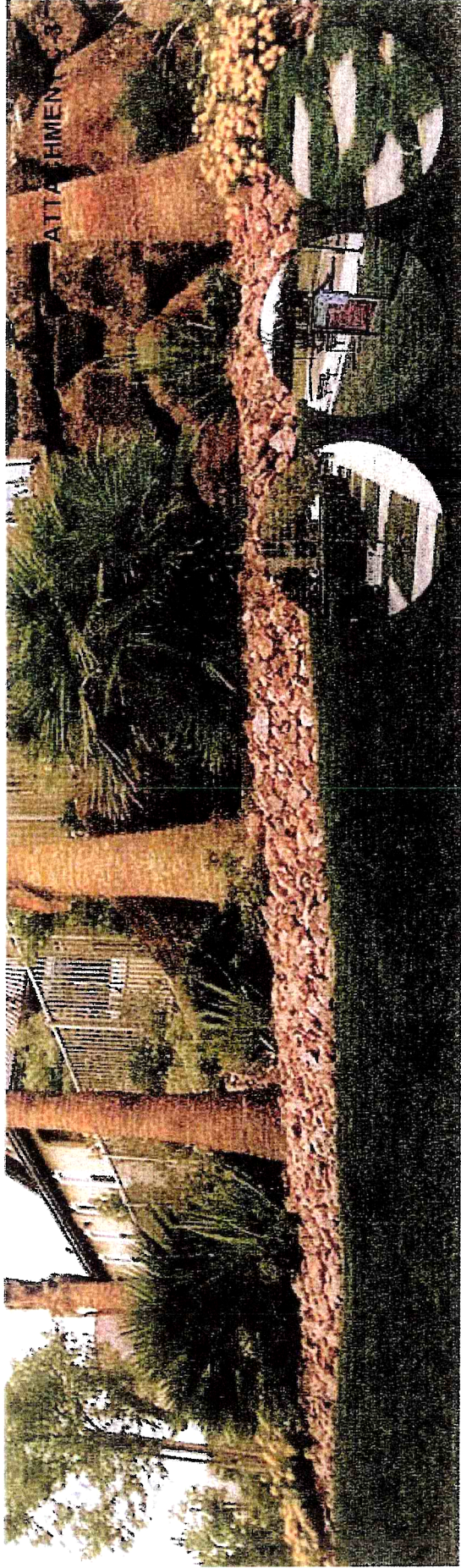
It's **EASY** to participate.

1-877-728-2282

www.bewaterwise.com



SAVE WATER
SAVE A BUCK



The newest Synthetic Turf looks and feels great

Today's Synthetic Turf systems are solid, reliable, durable and deliver the kind of form and function that can enhance any project. The look and feel, color and texture of some of the new generation of Synthetic Turf looks so close to real, that it has gained acceptance for a wide variety of applications.

Synthetic Turf is ideal for many landscape uses

Driven by need (low maintenance, drought tolerant, high traffic, water conserving), Synthetic Turf is now being adopted for use as more than a spot surface amenity—it has now become another landscape option for both small and large irrigated areas. The use of Synthetic Turf can also enhance and extend the livable area of residential and commercial properties.

A GREEN solution for water conservation

Synthetic Turf is the perfect solution for keeping landscapes green and saving water. Too, today's Synthetic Turf is specially designed for a variety of uses including residential and commercial landscaping. The newest Synthetic Turf features a softer, longer blade to create the look and feel of real grass.

As a result of low rain fall and limited water supplies, California businesses should reduce their water usage wherever possible. Conserving water is a major initiative to which everyone can contribute. So as well as providing an instant and constant green lawn during times of drought, Synthetic Turf can help save businesses thousands of dollars and save thousands of gallons of water as well.

Easy on the environment, easy on the eyes and easy underfoot, Synthetic Turf is the easy answer to keeping lawn areas green without water.

Synthetic Turf applications are many...

- Commercial Landscapes
- High Traffic Areas
- Playgrounds
- Commercial Common Areas
- Parks and Recreation
- Driving Ranges
- Roadways and Medians

The Goal is to *SAVE WATER!*

Synthetic Turf

\$0.30 REBATE per square foot

\$13,000 per acre

no minimum - no maximum
retrofit or new construction
must replace irrigated area

It's Time to Get Serious about Saving Water



Conservation Rebates for Business & Multi-Family Customers

Description	Retrofit Rebate Amount	New Construction Rebate Amount
High Efficiency (1.28 gpf*) Toilet: replacing ULF** Toilet	\$50	\$50
High Efficiency Toilet: replacing non-ULF Toilet (≥3.5 gpf)	\$300	\$50
Ultra-Low-Flush** Toilet Commercial/Multifamily***	\$200/\$120*	\$0
High Efficiency (0.0-0.25 gpf) Urinal: retrofit replacing ≥1.5 gpf	\$500	
High Efficiency (0.0-0.25 gpf) Urinal: retrofit replacing <1.5 gpf	\$250	\$250
High Efficiency (0.26-0.50 gpf) Urinal: retrofit replacing ≥1.5 gpf	\$400	
High Efficiency (0.26-0.50 gpf) Urinal: retrofit replacing <1.5 gpf	\$200	\$200
Cooling Tower pH/Conductivity Controller	\$3,000	\$3,000
Cooling Tower Conductivity Controller	\$625	\$625
Steam Sterilizer Retrofit	\$2,300/Device	\$2,300/Device
Connectionless Food Steamer	\$600/Compartment	\$600/Compartment
X-Ray Processor Recirculating System	\$4,400	\$4,400
Dry Vacuum Pump (max 2.0 HP)	\$125/Horsepower	\$125/Horsepower
High Efficiency Commercial Clothes Washer (coin and card operated)	\$430	\$430
Large Rotary Nozzle Retrofit	\$13/head (8 head minimum)	\$13/head (8 head minimum)
Weather-Based Irrigation Controller	\$1,000/Acre	\$1,000/Acre
Rotating Sprinkler Nozzle for Irrigation	\$5/Nozzle (25 nozzle minimum)	\$5/Nozzle (25 nozzle minimum)
Pre-rinse self-closing spray head	\$60	\$60
Water Broom	\$150	\$150

Toilet & urinal installations require a L.A. Dept of Building & Safety permit. Call (888) 524-2845 for plumbing permit information

*gpf - gallons per flush

**ULF - Ultra Low Flush 1.6 gallons per flush

Call 877-728-2282 or www.ladwp.com/cwr

***Multifamily customers must install a SPS certified toilet. List can be found at <http://pld.lapmo.org/> (go to "VIEW LADWP LISTINGS")

www.mwdsavesbruck.com/rebates.htm

Updated 11/15/2007



GAIL FARBER, Director

COUNTY OF LOS ANGELES

DEPARTMENT OF PUBLIC WORKS

"To Enrich Lives Through Effective and Caring Service"

900 SOUTH FREMONT AVENUE
ALHAMBRA, CALIFORNIA 91803-1331
Telephone: (626) 458-5100
<http://dpw.lacounty.gov>

ADDRESS ALL CORRESPONDENCE TO:
P.O. BOX 1460
ALHAMBRA, CALIFORNIA 91802-1460

IN REPLY PLEASE

REFER TO FILE:

WW-1

July 7, 2009

TO: Each Supervisor

FROM: Gail Farber *Gail Farber*
Director of Public Works

BOARD MOTION OF NOVEMBER 5, 2008, AGENDA ITEM 70-A IMPLEMENTATION ACTION PLAN FOR THE USE OF GRANULAR-ACTIVATED CARBON AND CHLORINE INTERIM RESPONSE

On November 5, 2008, your Board directed the Department of Public Works to conduct four community meetings in the Antelope Valley and Acton to present to the Los Angeles County Waterworks Districts' customers available disinfection options to comply with new Federal drinking water standards for trihalomethanes and report back to your Board within 120 days.

On March 11, 2009, we reported back to your Board with a recommendation to initiate discussions with the Districts' wholesale water agency, the Antelope Valley-East Kern Water Agency (AVEK), on the use of granular-activated carbon (GAC) and chlorine to comply with the new trihalomethanes standard. Your Board approved the recommendation and directed Public Works to report back to your Board with an implementation action plan within 120 days.

Following the motion, we initiated a discussion with AVEK, and AVEK's General Manager requested MWH Consulting Engineers to prepare cost estimates and design concepts to implement GAC treatment at the AVEK's treatment plants.

We received MWH Consulting Engineers' report on June 9, 2009, and are in the process of reviewing the report and assessing the financial impacts of implementation of GAC treatment on the Districts' customers. We will complete our analysis and provide your Board with a summary of the report, the financial impacts, and implementation action steps within 30 days.

Each Supervisor
July 7, 2009
Page 2

If you have any questions in the interim, please contact me or your staff may contact Adam Ariki at (626) 300-3300 or aariki@dpw.lacounty.gov.

AA:ea

H:\WWW\HOME\DVASQUEZ\2009_AMEMOS\Interim Board Report on GAC implementation v2 (2) (2).doc

cc: Chief Executive Office (Lari Sheehan)
County Counsel
Executive Office



GAIL FARBER, Director

COUNTY OF LOS ANGELES

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ALHAMBRA, CALIFORNIA 91802-1460

August 5, 2009

IN REPLY PLEASE

REFER TO FILE:

WW-1

TO: Each Supervisor

FROM: Gail Farber *Gail Farber*
Director of Public Works

BOARD MOTION OF NOVEMBER 5, 2008, AGENDA ITEM 70-A IMPLEMENTATION ACTION PLAN FOR THE USE OF GRANULAR-ACTIVATED CARBON AND CHLORINE

Background

On November 5, 2008, your Board directed the Department of Public Works to conduct a public outreach effort throughout the Antelope Valley to present information on available disinfection options to meet a new Federal drinking water standard for trihalomethanes (THMs) and report back to your Board within 120 days.

On March 11, 2009, we reported back to your Board with the results of our public outreach effort and made a recommendation, based on community input, that we initiate discussions with the Districts' wholesale water agency, the Antelope Valley-East Kern Water Agency (AVEK), on the use of granular-activated carbon (GAC) and chlorine to comply with the new THM standard. Your Board approved the recommendation and directed Public Works to report back to your Board with an implementation action plan within 120 days (see attached).

We initiated discussions with AVEK and, on April 15, 2009, AVEK's General Manager requested his consultant, MWH Consulting Engineers, to prepare a report analyzing impacts of implementation of GAC treatment at AVEK's treatment plants (copy attached).

Following is a summary of AVEK's report of impacts, the financial impacts of GAC treatment implementation on your Board's customers, and recommended implementation steps for your consideration.

Summary of AVEK Report Regarding Impacts of GAC Implementation

AVEK reports that implementation of GAC treatment and chlorine disinfection can be effectively incorporated into the existing AVEK treatment plants and will produce water meeting Federal drinking water standards for THM. The implementation of the treatment would require major capital improvements to AVEK's existing facilities. The estimated capital improvement cost of GAC treatment facilities is approximately \$70 million, and the estimated annual operation and maintenance cost is \$18 million. The timeline for completion of the improvements is estimated to be 36 to 42 months.

AVEK estimates the wholesale water rates it charges retail agencies will increase from \$325 per acre foot to \$595 per acre foot due to the capital improvement costs and ongoing maintenance and operation associated with GAC treatment.

Financial Impact to Waterworks Districts 37 (Acton) and 40 (Antelope Valley) Customers

The increase in AVEK wholesale water rates due to the implementation of GAC treatment would result in a recommendation that your Board consider a rate increase for both Districts 37 and 40. The estimated bimonthly rate increase is \$53 (46 percent) in Waterworks District 37 and \$38 (51 percent) in Waterworks District 40. This would result in an increase in current average bimonthly water bill from \$116 to \$169 in District 37 and from \$75 to \$113 in District 40.

Implementation Action Steps

1. Conduct a customer outreach effort, including public meetings, informational fliers and a survey to inform customers of the results of the AVEK report regarding the implementation of GAC treatment, the associated potential rate increases to customers of Waterworks Districts 37 and 40 and to verify the customers preferred method of treatment.
2. Report back to your Board and recommend a preferred treatment method for THM based on the results of customer outreach.

Each Supervisor
August 5, 2009
Page 3

3. Report your customers' preference, along with the other retail water agencies to AVEK for their use in determining which treatment method for THM they will implement.

AA:kk

H:\WWW\HOME\KKAJI\2009\Each Supv Memos\GAC TM Memo_rev.doc

Attach.

cc: Chief Executive Office (Lari Sheehan)
County Counsel
Executive Office ✓



GAIL FARBER, Director

COUNTY OF LOS ANGELES

DEPARTMENT OF PUBLIC WORKS

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IN REPLY PLEASE

REFER TO FILE: **WW-0**
A2952

March 11, 2009

TO: Each Supervisor

Gail Farber

FROM: Gail Farber
Director of Public Works

BOARD MOTION OF NOVEMBER 5, 2008, AGENDA ITEM 70-A PUBLIC OUTREACH EFFORT ON WATER DISINFECTION OPTIONS

Recommendations

1. Initiate discussions with the Antelope Valley-East Kern Water Agency on the use of granular activated carbon (GAC) and chlorine for its treatment plants instead of chloramines to comply with the new regulatory standards for trihalomethanes (THMs).
2. Report back to your Board with an implementation action plan within 120 days.

Background

On November 5, 2008, your Board directed Public Works to conduct a public outreach effort (including hosting community meetings throughout the Antelope Valley, providing information about chloramines to the media, and enclosing information about chloramines in water bills to the Waterworks Districts' customers) and report back to your Board within 120 days.

The following is a report describing the public outreach effort and summarizing the feedback received from the community meetings.

Public Outreach Effort

Community meetings were conducted in Acton, Lancaster, Palmdale, and Lake Los Angeles in late January. Presentations by the Los Angeles County Waterworks Districts' staff covered the following topics:

- Regulatory Requirements - The regulatory requirement to disinfect drinking water to protect the public's health and safety from potential microbial contamination.
- Health Effects - The health effects of THMs, known carcinogens, and by-products of the disinfection of drinking water with chlorine.
- Disinfection Options – The two applicable disinfection options identified by a study conducted for the Antelope Valley-East Kern Water Agency by a private engineering consultant in 2005 that were discussed are:
 1. Chloramines - Use of chloramines (a combination of chlorine and ammonia), instead of the currently used chlorine for disinfection.
 2. Granular Activated Carbon - Use of GAC filters to remove organic materials that produce THMs when chlorine is used to disinfect the water.
- Advantages and Disadvantages - The advantages and disadvantages of available disinfection options to comply with newly enacted, more stringent water quality standards for THMs (see attached).

In addition to the community meetings, the following public education actions were completed:

- Included educational materials in the Districts' Fall Splash newsletter sent to all customers with their bills.
- Presented to the Palmdale Chamber of Commerce on November 19, 2009, that included an interview with the local television station.
- Provided information to the Antelope Valley Press for an article published on January 23, 2009.
- Conducted a telephone interview with Jim Crockett for the Agua Dulce/ Rosamond/Lake Los Angeles News.

- Responded to numerous correspondences and emails and provided the individuals with information related to chloramines.

Meeting Attendees - There were 206 community members who signed the attendance sheet. The majority of the attendees favored the use of GAC and chlorine disinfection.

Following are the most frequently raised concerns regarding the use of chloramines for drinking water disinfection.

- Skin rashes and respiratory problems that are purportedly attributed to the use of water disinfected with chloramines.
- Effects on fish and amphibians. The ammonia in chloraminated water is harmful to fish and amphibians if not removed.
- Leaching of lead and copper from household plumbing. Water that is disinfected with chloramines could result in more leaching of lead and copper from household plumbing than with chlorine.
- Contamination of groundwater with nitrate. The ammonia from chloraminated water, used to irrigate landscaping, could contaminate the groundwater basin.
- Formation of yet-to-be-regulated disinfection by-products. The potential for harmful disinfection by-products from the use of chloramines.
- Removal of chloramines from water. The cost to remove chloramines using home treatment systems.

These concerns are not unique to the residents of Acton and the Antelope Valley and have been extensively investigated and addressed by the Federal Environmental Protection Agency, the State Department of Public Health, and other reputable organizations.

Each Supervisor
March 11, 2009
Page 4

Conclusion

The current chlorine disinfection of the water in Los Angeles County Waterworks District Nos. 40, Antelope Valley, and 37, Acton, has to be changed to meet new, more stringent water quality requirements. There are two disinfection options being considered, each has its own technical advantages and disadvantages. Both options will result in an increase in the cost of water to the Districts' 55,000 customers and will be subject to Proposition 218 notification requirements.

We held community meetings in Acton, Lancaster, Palmdale, and Lake Los Angeles to solicit feedback on the two options. The majority of the meeting attendees favored the use of GAC and chlorine disinfection.

Before implementation of GAC, we need to work with the Antelope Valley-East Kern Water Agency to resolve any technical issues to ensure the safety of the treated water. GAC does not remove bromide salt, prevalent in State Water Project water during dry periods, and it has not been used in a large scale filtration plant for the control of THMs. Recently, the Palmdale Water District started using GAC and is still making adjustments to its system to ensure safety standards are met. We also want to carefully monitor GAC filtration costs since the cost of the materials has increased almost 133 percent in the last five years.

DWP:dvt

H:\WWW\HOME\DVASQUEZ\2009_AMEMOS\A2952 Board Report.doc

Attach.

cc: Chief Executive Office (Lari Sheehan)
County Counsel
Executive Office

ADVANTAGES AND DISADVANTAGES OF DISINFECTION OPTIONS

March 11, 2009

1. **Chloramines** – Use of chloramines, a combination of chlorine and ammonia, instead of the currently used chlorine for disinfection. Chloramines do not produce THMs when they are used to disinfect water.

Advantages	Disadvantages
Low levels of THMs are formed.	There is a potential for the growth of bacteria through a process called "nitrification" if the distribution system is not adequately maintained.
Chloramines are likely to form less THMs in the distribution system and last longer, which helps prevent the growth of bacteria.	Chloramines can be harmful to fish and amphibians if a water conditioner is not used.
Most people report better taste and odor for chloraminated water as compared to chlorinated water.	Kidney dialysis equipment must be modified to remove chloramines.
Use of chloramines will modestly increase customers' water bills by 5% to 16%, depending on water usage.	Use of chloramines could cause more lead and copper leaching in household plumbing than chlorine if corrosion control practices are not followed.

Communities in California using Chloramines: Agoura Hills, Anaheim, Antioch, Beverly Hills, Brentwood, Burbank, Burlingame, Calabasas, Corona, El Segundo, Glendale, Goleta, Hidden Hills, Irvine, Lake Elsinore, Livermore, Long Beach, Malibu, Manhattan Beach, Martinez, Murietta, Newport Beach, Norco, Oakland, Orange, Palo Alto, Pasadena, Pittsburgh, Pleasanton, Redwood City, Riverside, San Bruno, San Diego, San Francisco, Santa Ana, Santa Barbara, Santa Clara, Santa Clarita, Santa Maria, Santa Monica, Temecula, Topanga, Tustin, Val Verde, Ventura, and Westlake Village.

2. **Granular Activated Carbon** – Use of GAC filters removes organic materials that produce THMs when chlorine is used to disinfect the water.

Advantages	Disadvantages
It removes organic materials and, as a result, produces low levels of THMs and, overall, potentially better water quality.	Use of GAC will increase customers' water bills by 28% to 96%, depending on water use.
Most people report better taste and odor due to removal of organic materials from the water.	GAC does not remove bromide salt (prevalent in State Water Project water particularly during dry periods), which forms THMs when chlorine is used for disinfection. Additionally, because GAC does not remove all of the organic materials from water, THMs will continue to be formed in the distribution system.
	The need for frequent GAC replacement could impact treatment plant operations and production capacity.

Agencies in California using GAC: There are presently two agencies in California using GAC, and they are Crestline-Lake Arrowhead Water Agency and Palmdale Water Agency.



MINUTES OF THE BOARD OF SUPERVISORS
COUNTY OF LOS ANGELES, STATE OF CALIFORNIA

Sachi A. Hamai, Executive Officer-
Clerk of the Board of Supervisors
383 Kenneth Hahn Hall of Administration
Los Angeles, California 90012

At its meeting held Wednesday, November 5, 2008, the Board took the following action:

70-A

The following statement was entered into the record for Supervisor Antonovich:

"In 2005 the Antelope Valley East Kern Water Agency's ('AVEK') staff recommended to its Board of Directors to switch the disinfection of treated water at its treatment plants from chlorine to chloramines. This action was a result of a new drinking water standard imposed by the United States Environmental Protection Agency and the State of California. Given the new standard, chlorine is no longer a viable method of disinfection.

"The use of chloramines for disinfection of water has been in use throughout the United States. While utilized by other water agencies in California, chloramine treatment has never been used in the Antelope Valley. For example, the Littlerock Irrigation District, Palmdale Water District, Quartz Hill Water Company, and the Rosamond Community Standards District have always utilized alternatives to chloramines.

"In its deliberations, AVEK consulted with its larger customers, which includes the Los Angeles County Waterworks District 40. Although County staff supported the decision to convert to chloramine disinfection, staff did not notify customers in advance, nor did the District conduct any public outreach.

"Many residents in Antelope Valley have expressed concerns about chloramine treatment. These include concerns about potential allergic reactions, harmful affects to pets, degradation of infrastructure, and impacts upon residential septic systems. These issues should be considered before chloramine treatment is implemented. Waterworks District 40 staff should hold community meetings throughout the Antelope Valley to solicit input, answer questions, and address the public's concerns about chloramine disinfection."

(Continued on Page 2)

70-A (Continued)

Therefore, on motion of Supervisor Antonovich, seconded by Supervisor Molina, unanimously carried (Supervisor Yaroslavsky being absent), the Acting Director of Public Works was directed to take the following actions:

1. Immediately postpone the implementation of chloramine treatment by County Waterworks District 40 for a minimum of 120 days;
2. Coordinate with Antelope Valley East Kern Water Agency's staff on this action;
3. Conduct a public outreach effort that includes hosting community meetings throughout the Antelope Valley, providing information about chloramines to the media, and enclosing information about chloramines in water service bills to District customers; and
4. Report back to the Board within 120 days with a recommendation.

07110508_70-A

Copies distributed:

Each Supervisor
Chief Executive Officer
County Counsel
Acting Director of Public Works

TECHNICAL MEMORANDUM



To: Russell Fuller
From: Jim Borchardt
Subject: GAC Alternatives for AVEK

Date: June 10, 2009
File:

Granular Activated Carbon (GAC) has been discussed as an alternate treatment process to monochloramines for control of disinfection by-products (DBP) at the Antelope Valley-East Kern Water Agency (AVEK) surface water treatment plants. AVEK has planned and built facilities to utilize monochloramine to control formation of DBPs such as total trihalomethanes (TTHMs) and haloacetic acids (HAA5). However, concerns expressed by some customers regarding the use of monochloramines have resulted in the request to more fully document the GAC alternative.

This memorandum presents the MWH investigation on the use of GAC for the control of DBPs, including the development of conceptual cost estimates for incorporating this process into the AVEK treatment facilities.

Background

AVEK is nearing completion of the DBP Control Project to upgrade their treatment plants with ozonation, deep-bed, biologically active carbon filters, standby primary disinfection, and monochloramines. These new facilities will provide substantial water quality improvements, including cryptosporidium inactivation and taste and odor control. Chemical feed facilities to create a disinfectant residual using monochloramine have been completed, but have not been placed into service pending a final decision on this treatment approach.

Implementation of monochloramines will require coordination with the California Department of Public Health, public notification, chemical purchase contract, and a monitoring program. It is estimated that implementation would incur additional operational costs of approximately \$5 to \$8 per acre-foot and require about 9 months to complete.

GAC Alternative Development

Alternatively, GAC facilities could be added to each of AVEK's four existing treatment facilities. The GAC facilities would work effectively with AVEK's other treatment processes, and would be installed following the existing filters and before the addition of chlorine. Chemical feed facilities for monochloramines would simply remain inactive, and free chlorine would be used for the disinfectant residual.

Treatment using GAC for DBP control would require extensive new facilities, including GAC contactors (vessels), civil site work to allow access for truck loading/unloading, washing and washwater recovery facilities, and new pump stations to allow treated water to be returned to

the plant clearwells. Sufficient space must be provided at each site, along with connections to main roadways, major piping, electrical switchgear, and instrumentation and control systems. At a conceptual level, it appears that implementation is feasible at each treatment plant, and will require CEQA compliance, financing, design and construction of facilities, coordination with the California Department of Public Health, GAC purchase contract, and a monitoring program. It is estimated that the GAC alternative would require between 36 and 42 months for completion.

Predicted GAC Requirements

Integrating post-filtration GAC into the existing treatment processes would reduce the subsequent formation of TTHMs and HAA5 in the distribution system by removing a fraction of organic precursor compounds from the water. Two reports on GAC treatment of State Water Project (East Branch) were reviewed to evaluate the technical and economic aspects of this approach on AVEK facilities:

- Booth, S. et al. (2006) DBP control in high bromide water while using free chlorine during distribution, AwwaRF report.
- MWH Report (2001) Crestline-Lake Arrowhead Water Agency Disinfection Alternatives Evaluation.

In each instance, field data show GAC contactors operated with 15 to 20 minute empty bed contact times (EBCT) on average water quality provide effective removal of DBP precursors for a period of about 60 to 75 days before breakthrough requires GAC replacement. GAC replacement frequency may be increased if multiple contactors are operated in parallel and in a staggered configuration. This is a common mode of operation in which one contactor is taken off-line at a time when the blended effluent exceeds the target effluent TTHM concentrations. Analysis shows that if ten or more contactors are utilized in this fashion, the GAC replacement frequency can be extended.

The capacity and average water production of the AVEK treatment plants are shown in **Table 1**. In total, AVEK's treatment plants provide 118 mgd of capacity and produce on average about 88,000 ac-ft of treated water.

Table 1 – AVEK Water Production Data

Plant	Design Capacity (MGD)	Average Production (MGD)	Average Production (ac-ft/yr)
Acton	4	2.7	3,025
Eastside	10	6.7	7,500
Rosamond	14	9.3	10,400
Quartz Hill	90	60	67,200

One important consideration for predicting GAC performance requirements is the presence of high levels of bromide in the raw water. Replacement becomes more frequent when bromide levels increase. Unfortunately, this does periodically occur in State Water Project supplies due to the influence of the Sacramento-San Joaquin River Delta on water quality.

For this reason, both average and high bromide conditions are presented in the analysis. Based on the two studies referenced above, the predicted GAC requirements for each of AVEK's four treatment plants are presented below in **Table 2**. In total, AVEK would need to purchase nearly 11 million pounds of GAC in an average year to comply with the DBP regulations at all four plants. In a year of poor water quality, GAC purchases could increase to as much as 19 million pounds.

Table 2 – GAC Contactor and Replacement Requirements

Plant	No. Vessels	Replacement Period		GAC Inventory (lbs)	GAC Use (lbs/yr)	
		Ave Br	Hi Br		Ave Br	Hi Br
Acton	8	130	70	160,000	450,000	830,000
Eastside	20	160	90	400,000	920,000	1,600,000
Rosamond	28	160	90	560,000	1,300,000	2,300,000
Quartz Hill	180	160	90	3,600,000	8,200,000	14,600,000

¹ Empty Bed Contact Time (EBCT) is 15 minutes

² GAC contactor vessels hold 20,000 lbs.

³ GAC utilization rate is 0.045 g/l, Booth S., et al (2006)

Estimated GAC Costs

Construction and O&M costs have been estimated for each of AVEK's four treatment plants based on the requirements presented above. Estimates are in June 2009 dollars and do not account for inflation. The opinion of probable construction cost reflects a conceptual level of project development (AACE Class 5), with a range of accuracy from -30 to +30%. Engineering, administration, and construction contingency are included at the stated percentage.

Quotes were received both for costs of GAC contactor vessels and GAC purchase, and the lowest quotes were used in each instance. For the purposes of this conceptual study, GAC vessels have been assumed at all four installations. While this is a likely configuration for the three smaller plants, additional engineering effort might find custom concrete GAC contactors more appropriate at the larger Quartz Hill Plant. This level of refinement should be considered if future studies are warranted.

The results of the costs estimates are presented in Tables 3 and Table 4 on the following page.

Table 3 – Opinion of Probable Construction Costs¹

Cost Items	Acton	Eastside	Rosamond	Quartz Hill
Contactor Vessels ²	\$ 880,000	\$ 2,200,000	\$ 3,100,000	\$ 19,800,000
Pump Station	200,000	300,000	500,000	1,300,000
Civil/Sitework	300,000	600,000	700,000	4,700,000
Yard Piping	200,000	500,000	600,000	4,900,000
Electrical/I&C	300,000	700,000	800,000	3,900,000
Sub-Total	\$ 1,900,000	\$ 4,300,000	\$ 5,700,000	\$ 34,600,000
Engineering/Admin (20%)	400,000	800,000	1,100,000	6,900,000
Contingency (30%)	600,000	1,300,000	1,700,000	10,400,000
Total Estimated Cost	\$ 2,900,000	\$ 6,400,000	\$ 8,500,000	\$ 52,000,000

¹ The Class 5 opinion of probable construction cost is prepared in accordance with the Association for the Advancement of Cost Engineering. It is acknowledged that MWH has no control over costs of labor, materials, competitive bidding environments and procedures, unidentified field conditions, financial and/or market conditions, or other factors likely to affect the opinion of probable construction cost of this project, all of which are and will unavoidably remain in a state of change, especially in light of the high volatility of the market attributable to Acts of God and other market events beyond the control of the parties. It is further acknowledged that this is a "snapshot in time" and that the reliability of this opinion of probable construction cost will inherently degrade over time. MWH cannot, and does not, make any warranty, promise, guarantee, or representation, either expressed or implied, that proposals, bids, project construction costs, or cost of operation or maintenance will not vary substantially from MWH's good faith Class 5 opinion of probable construction cost.

² GAC contactor vessel cost based on quote provided by Calgon Carbon Corporation

Table 4 – Estimated O&M Costs

Cost Items	Acton	Eastside	Rosamond	Quartz Hill
GAC Replacement ¹	\$ 680,000	\$ 1,380,000	\$ 1,950,000	\$ 12,300,000
Labor ²	52,000	52,000	52,000	104,000
Energy ³	9,000	24,000	32,000	210,000
Maintenance ⁴	58,000	130,000	170,000	1,040,000
Total Annual O&M Cost	\$ 800,000	\$ 1,600,000	\$ 2,200,000	\$ 13,600,000

¹ GAC replacement cost estimated at \$1.50 per pound.

² Labor estimated at \$50 per hour.

³ Energy estimated at \$0.15 per kwh and 21 kwh per ac-ft/yr.

⁴ Maintenance estimated at 2% of estimated construction cost.

The values from Tables 3 and 4 are summarized and presented below in Table 5 as annual and unit costs. Unit costs of GAC treatment for DBP control at the AVEK plants are estimated to range from a low of \$265 per acre-foot to a high of \$340 per acre-foot, with an average across of all four plants of \$270 per acre-foot.

Table 5 – Estimated Annual and Unit GAC Costs

Plant	Construction Cost (\$)¹	O&M Cost (\$)	Total Annual Cost (\$)	Unit Cost (\$/ac-ft)
Acton	\$ 230,000	\$ 800,000	\$ 1,030,000	\$ 340/ac-ft
Eastside	510,000	1,600,000	2,100,000	\$ 280/ac-ft
Rosamond	680,000	2,200,000	2,900,000	\$ 280/ac-ft
Quartz Hill	4,200,000	13,600,000	17,800,000	\$ 265/ac-ft
Totals	\$ 5,600,000	\$ 18,200,000	\$ 23,800,000	\$ 270/ac-ft

¹ Based on 5% interest rate and 20 year recovery period (Capital Recovery Factor = 0.08024).

Additional Considerations

GAC replacement accounts for roughly 90% of the annual O&M cost and 70% of the combined total annual cost. Probable costs are highly dependent upon the assumed carbon utilization rate, which may vary depending on raw water quality, performance of other treatment processes, the presence of bromide, and the specific characteristics of the GAC. One example of this has been illustrated in Table 2, where high bromide alone could increase GAC use by 80% over average conditions.

The GAC alternative would limit TTHM concentrations in the distribution system to a range of about 60 to 80 ug/l, while the monochloramine alternative would control TTHM concentrations to below 30 ug/l. To lower TTHM concentrations to equal levels, the costs of GAC treatment would increase substantially to nearly \$700 per acre-foot, in comparison to the \$5 to \$8 per acre-foot for monochloramines.

Other considerations associated with a GAC alternative include:

- GAC costs are variable and closely tied to the price of energy for manufacture and transport.
- Roughly 90% of GAC is currently imported and supply reliability is not assured.
- The future of import tariffs on GAC costs is not known.
- Implementation of the GAC alternative would make AVEK the largest known public user of GAC west of the Mississippi River.
- It is estimated that use of GAC at AVEK will consume roughly 120,000 mwh of power and generate about 100,000 metric tons of carbon dioxide each year.



GAIL FARBER, Director

COUNTY OF LOS ANGELES

DEPARTMENT OF PUBLIC WORKS

"To Enrich Lives Through Effective and Caring Service"

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January 25, 2011

IN REPLY PLEASE

REFER TO FILE:

TO: Each Supervisor

FROM: Gail Farber
Director of Public Works

BOARD MOTION OF NOVEMBER 5, 2008, AGENDA ITEM 70-A PUBLIC OUTREACH EFFORT ON WATER DISINFECTION OPTIONS

On November 5, 2008, your Board directed the Department of Public Works to conduct a public outreach effort in the Antelope Valley to present information on available disinfection options to meet a new Federal drinking water standard for trihalomethanes (THMs) and report back to your Board within 120 days (see Attachment 1).

On March 11, 2009, we reported back to your Board with the results of our public outreach effort and advantages and disadvantages of two disinfection options: (1) chloramines (a combination of chlorine and ammonia) and (2) granular-activated carbon (GAC) and chlorine, to meet the new Federal drinking water standard for THMs. We also recommended to your Board that we discuss with the Antelope Valley-East Kern Water Agency (AVEK), the wholesale water agency that supplies State Water Project water to the Los Angeles County Waterworks District Nos. 37, Acton, and 40, Antelope Valley (Districts), the use of the GAC and chlorine option. Your Board approved the recommendation and directed Public Works to report back to your Board with an implementation action plan within 120 days (see Attachment 2).

On August 5, 2009, we reported back to your Board with a summary of a study conducted by an AVEK consultant on the GAC and chlorine option and its impact on customers' water rates. Along with the report, we proposed an implementation action plan that recommended holding community meetings to discuss construction and operation costs of the needed facilities to implement the GAC and chlorine option and a customer opinion survey to verify the customers' preferred disinfection option (see Attachment 3).

In December 2009, four community meetings, facilitated by a professional consultant, were held in Acton, Lancaster, Palmdale, and Lake Los Angeles to discuss the implementation of the GAC and chlorine disinfection option. Also, in April 2010, a phone survey of 440 District customers was conducted by Fairbank, Maslin, Maullin, Metz & Associates, a public opinion research and strategy firm that has been in business for over 20 years, to assess customers' opinions of the two available disinfection options.

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BOARD OF SUPERVISORS
COUNTY OF LOS ANGELES

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Based on the information reported in the previous Board memos, the study prepared by AVEK's consultant on the GAC and chlorine option, and customers' input from the community meetings and phone survey, we conducted a comprehensive analysis following the American Public Works Association's Framework for Sustainable Communities (Sustainability Analysis). The Analysis assesses the impacts of the two disinfection options in the areas of ecology, economy, empowerment, efficiency, and health. Projects and services with high value rating in these five areas are considered sustainable in meeting community needs. Following is a summary of the analysis:

- **Chloramines option** - was rated high in value in the areas of ecology, economy, and efficiency due to its low carbon footprint in the environment, low implementation cost, high effectiveness in meeting the THM standard, and widespread and well-understood application. It has risk in the empowerment area because the majority of survey respondents favored the GAC and chlorine option over the chloramines option (56 percent prefer GAC with chlorine and 31 percent prefer chloramines). However, the survey also indicates that 65 percent of respondents changed their selection at least once during the course of the survey and 6 percent of respondents were consistently undecided. These results indicate that over 70 percent of the respondents are persuadable on either one of the options. Details of the survey results are included in Attachment 4.
- **GAC and chlorine option** - was rated high in value in the empowerment area because the majority of the survey respondents favor the GAC and chlorine option over the chloramines option. However, it has risks in the ecology and economy areas because it would produce a large amount of carbon dioxide and substantially increase customers' water bills, respectively.

The complete analysis is included in Attachment 5.

Recommendation

We recommend making the results of the Sustainability Analysis and customers' opinion survey available to AVEK's Board of Directors without any specific recommendation of a disinfection method. As is the case in all water treatment decisions, AVEK's Board of Directors should choose the disinfection option it believes most suitable to comply with regulatory drinking water standards.

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Attach.

cc: Chief Executive Office (Rita Robinson)
County Counsel
Executive Office